

gas in them. The insignificant action of steam in Kilauea is declared by the author to be the most remarkable fact about it; for he says that it works "practically without steam, but with colossal quantities of highly fluid lava." Hence explosive action is very exceptional, though such an eruption did once occur in that year of violent upheavals 1789. It is owing to Kilauea having been built by the slow, quiet, piling up of lavas without explosions, that its crater is so very different from that of the Italian volcanoes. Instead of a narrow, deep, gullet, it is a broad, open, cauldron-shaped depression. The accompanying view illustrates the nature of the crater; it is from a photograph taken from the north-western corner, and looks due southward. In the foreground are some blocks of lava, on the margin of the plateau in which the crater lies; beyond this is the flat floor of the primary or major crater, at the foot of a vertical lava wall, 140 metres in height. The greatest diameter of the major crater is 4.7 kilometres; but the width to the opposite wall, seen in the figure as a long, low line in the far distance, is at this point only a little over 3 kilometres. In the centre of the view is seen the famous lava lake, 250 metres in diameter; this occurs in a raised tertiary crater in the centre of the depressed secondary crater. This latter extends across the view from side to side, but it is small in comparison with the primary crater; its average diameter is only 700 metres, so that its area is only about half a square kilometre, whereas the major crater occupies 10.6 square kilometres. The depth of the secondary crater is about 20 metres.

Dr. Friedlaender remarks that in addition to the subjective difficulty in the description of a volcano, there is, also with Kilauea, the objective difficulty of the rapid changes that take place there. These render necessary frequent periodical re-descriptions. One such change is now in progress, for after a pause of fifteen months the mountain is again in active eruption.

NOTES.

THE British Section of the International Memorial to Pasteur has now assumed definite shape, and the Provisional Committee, which already includes the names of the Dukes of Devonshire and Westminster, and many distinguished men of science from all parts of the United Kingdom, held its first meeting last Friday, at the rooms of the Royal Society, Burlington House, under the presidency of Sir Joseph Lister. It was unanimously decided to apply for subscriptions towards the erection of a monument to Pasteur in Paris, from persons in the United Kingdom, India and the Colonies, interested in science and the various industries which have been benefited by Pasteur's labours. An Executive Committee was formed, consisting of Sir Joseph Lister, Sir John Evans, Sir Henry Roscoe, Dr. Thorne Thorne, and Prof. Percy Frankland (Hon. Secretary). Subscriptions may be sent to Sir John Evans, who will act as Hon. Treasurer, at the Royal Society, Burlington House, W.

At the stated meeting of the Royal Irish Academy, held on March 16, the Earl of Rosse, K.P., F.R.S., was elected President, in succession to Dr. J. Kells Ingram, whose term of office had expired. The President nominated as Vice-Presidents—The Rev. Dr. Haughton, F.R.S., the Most Rev. Bishop Donnelly, D.D., Dr. J. Kells Ingram, and Dr. Ben. Williamson, F.R.S. The following were elected Honorary Members in the Department of Science—Sir Joseph Lister, Bart., P.R.S., Sir W. H. Flower, K.C.B., Rev. T. G. Bonney, F.R.S., and Prof. Wm. Ramsay, F.R.S.

IN the Japanese Imperial Budget for the current year, we observe that a sum of 21,639 dols. has been set aside for earthquake investigation. This is a grant over and above the usual expenditure of the Central Observatory controlling the seismic survey of the country.

THE monument to Lobachevsky will be unveiled this autumn at Kazan. It consists of a bronze bust of the late geometer, one metre high, placed on a column of black polished granite, about 50 centimetres in diameter and 1.4 metres high, standing upon two steps of grey unpolished granite. The total height of the monument is 3.6 metres, and its cost about 3,300 roubles (£330).

WE learn from the *British Medical Journal* that Prof. Behring has given the half of the Alberto Levi prize of the Paris Academy of Sciences, recently awarded to him (amounting to £1000) to the Prussian Government Fund for the Furtherance of Research on Serum Treatment. The moneys received by the official control stations, where the diphtheria antitoxin is tested before it is allowed to be sold, will also be paid into this fund.

THE National Academy of Sciences, acting on the request of the Secretary of the Interior of the United States, has reported a Commission to investigate the forestry problem, consisting of Charles S. Sargeant, Alexander Agassiz, Henry L. Abbot, William H. Brener, Arnold Hague, and Gifford Purchot. The Secretary will recommend to Congress an appropriation of 25,000 dols. to cover the expenses of the Commission.

GENERAL JOHN B. WOODWARD, under whose able administration the Brooklyn Institute developed into the largest local scientific society in the world, with a membership of 3700, died on March 7, of pneumonia, after a short illness. General Woodward was for many years President of the Brooklyn Institute, but declined re-election last spring. He held many other prominent stations, having been a general in the army during the war of the rebellion, a bank president, candidate for mayor of the city, and President of the Society of Titans, none of whom were less than six feet two inches high. He was sixty years old.

THE Brooklyn Institute has completed negotiations for the purchase of the collection of Lepidoptera made by the late Berthold Neumoegen, comprising 40,000 to 45,000 specimens comprising 13,000 to 14,000 species, upwards of 1000 being type-specimens. This is the finest collection in America. As much as 100 dols. was paid by Mr. Neumoegen for a single specimen in several instances. The Institute will also secure the collection of Jacob Doll, of over 55,000 specimens, and will employ Mr. Doll as curator. Edward L. Graef will present his collection of about 20,000 specimens. The Institute already owns the Calverley collection; and the aggregate of all will give it the most complete collection of Lepidoptera in the world.

THE opening of the bicycle season shows the importance of that vehicle as a means of locomotion, and its potency as a factor in promoting good roads. The New York and Brooklyn Bridge has just been made free to bicycles, a change which required an Act of the Legislature to secure it. The grant for paving in New York City this year includes 1,000,000 dols. for asphalt pavement in a total amount of 1,250,000 dols. The pneumatic tire has been applied to ambulances in Brooklyn with great success. The ingenuity of inventors is taxed to devise improvements in all parts and appliances of the machine; and while the New York Cycle Exhibition last January was the largest exhibition of any special machinery that has been held in America, the exhibition now in progress in Brooklyn adds several apparently useful novelties not shown heretofore.

THE Governor of New Jersey has signed the Bill ceding the palisades of the Hudson to the United States Government for a national park.

THE General Electric Company and the Westinghouse Electric Company have combined, and each will be allowed to use the patents of the other.

IN connection with the Hungarian Millennial Exhibition, which will be opened on May 2, a Congress of Mining and Geology will be held at Budapest on September 25 and 26.

THE third International Congress of Dermatology will be opened in London on August 4, and will terminate on August 8. The President will be Mr. Jonathan Hutchinson, F.R.S.

WE regret to record that Prof. Sappey, the distinguished anatomist, died at Paris on March 14. His elaborate "Treatise on Descriptive Anatomy" is one of the best contributions to anatomical literature published in any language. He was a member of the Section d'Anatomie et Zoologie of the Paris Academy of Sciences.

THE *Scientific African* states that Mr. M. A. Schlechter, of the Botanical Museum, Grünwald Strasse, Berlin, is about to start on a collecting tour in South Africa. He will visit the Coud-Bokeveld, Namaqualand, Transvaal, and the Limpopo and Zambesi rivers.

RUSSIAN astronomers are completing their arrangements for viewing the forthcoming eclipse of the sun. The Pulkova Observatory will send an expedition to the Lower Amur; the Academy of Sciences has chosen Novaya Zemlya for the seat of its operations; so has the Kazan Society of Naturalists; while the Geographical Society will send the Director of the Irkutsk Meteorological Observatory, A. V. Voznesensky, to Olekminsk, on the Lena, for meteorological observations. Prof. Glasenapp and L. G. Vuchikhovsky propose to go to Finland on their own account. The young Russian Astronomical Society (it was founded only in 1891) directs its chief attention to physical observations, and it will have three parties of observers, provided with photographic appliances. The chief station will be on the Lena, where the duration of the eclipse is the longest, and it is proposed to photograph there the corona by Schaeberle's method, with an objective of long focal length, and also to photograph, by means of two spectrographs, the spectrum of the corona, as well as the limb of the sun, by means of a camera provided with a Rutherford prism. At the second station, on the bay of the Ob, the corona will be photographed by means of several ordinary cameras; while at the third station, in the eastern parts of the Uleaborg province, to the north of Enontekis, the corona will be photographed by means of several cameras following the movement of the sun; and it is intended to establish a comparison between the spectrum of the corona and that of helium. The usual determinations of the duration of the eclipse will be made at the first and third stations.

MR. R. H. SCOTT has sent us a cutting from the *Diario Oficial*, which records that on March 2 a well-marked earth-movement passed over the capital of Mexico at oh. 24m. a.m., Mexico time, the direction being from north-east to south-west, and the duration about twelve seconds. The shock was recorded at other places as follows:—

Place.	Time. h. m.	Duration. s.	Direction.
Tecuitatlan ...	11 57 ...	20 ...	—
Colima ...	12 3 ...	30 ...	W.N.W. to E.S.E.
Morelia ...	12 12 ...	...	S.S.E. to N.N.W.
Manzanillo ...	12 20 ...	30 ...	—

THE question as to the desirability of retaining the Museum of the Geological Society has formed the subject of long deliberations by the Council of the Society. It was announced at the recent annual meeting that, in accordance with the report of a special Committee, the Trustees of the British Museum had been asked whether they would undertake to house and care for the collections, keeping type-specimens and specimens illustrative of papers read before the Society distinct, and defraying also the expenses of transference. To these conditions the Trustees have assented, and the matter will before long be submitted to the Fellows for their decision at a special general meeting.

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PROF. STROUD informs us that in obtaining photographs with Röntgen rays, the time of exposure can be reduced by placing a card covered with barium platino-cyanide immediately in front of, and in contact with, the sensitive plate. A very good shadow-picture of the bones of the fingers was thus obtained by Prof. Stroud with a two minutes' exposure, whereas without the fluorescent card an exposure of from twelve to fifteen minutes was required to give a similar result. It is suggested that the introduction of some suitable fluorescent substance (rendered active by X-rays) into the sensitive film of photographic plates would greatly shorten the time of exposure requisite.

THE gigantic extinct birds of the order "Stereornithes," which are peculiar to the Eocene beds of Patagonia, have been until lately quite unrepresented in the museums of Europe. Sir William Flower has just acquired for our National Collection the series of the remains of these birds belonging to Señor Florentino Ameghino, of Buenos Ayres. This includes a complete skull of *Phororhachos inflatus*, which is of most extraordinary size and appearance, and the lower jaw of an allied species (*P. longissimus*), about two feet in length.

UNDER the name *Canis holubi*, Dr. L. V. Lorenz has lately described a new wild dog from Western Matabeleland. The specimens of this new species, received by the K.K. naturhistorische Museum of Vienna from Dr. E. Holub, had been previously assigned to *C. adustus*, Sund., but Dr. L. v. Lorenz (*Verh. Zool.-Bot. Ges. in Wien*, 1895) now points out the differences between these two nearly allied species. In a subsequent paper (*Ann. d. K.K. naturh. Hofmuseums*, xi. h. 1), Dr. Lorenz gives further particulars, and figures the skull of *C. holubi*.

UPWARDS of sixty ornithologists assembled on Wednesday, the 18th inst., at the monthly meeting of the British Ornithologists' Club, held at Frascati's Restaurant in Oxford Street. The proceedings were of special interest on account of the splendid series of more than 900 eggs of the Cuckoo, which were on view on this occasion, having been assembled together from the cabinets of various collectors by the energy of Mr. Edward Bidwell. Most of the Cuckoos' eggs were accompanied by clutches of the eggs of the foster-parents, in the nests of which the mother-cuckoo had placed them. There are about 110 foster-parents at present known of *Cuculus canorus*, and examples of the eggs of 76 of these foster-parents, accompanied by one or more Cuckoos' eggs, were exhibited to the meeting. The conclusions arrived at by Dr. Eugene Rey, as stated in a recent number of this journal (see *NATURE*, December 26, 1895, vol. liii. p. 176), were well illustrated by this excellent series, which was believed to be the largest ever got together on one occasion.

IN a recent number of *NATURE*, February 27 (vol. liii. p. 393), under the heading "The Destruction of Trees by Lightning," we gave an account of the investigations which had been carried out by Jonescu and others to determine, if possible, the reasons underlying the observed facts that some kinds of trees are more liable to be struck by lightning than others. It was there stated that the whole question seemed to turn on the nature of the tree—that is, whether it was a tree rich in resin, or one rich in starch; further, the degree of conductivity seemed to increase the less oil and the more starch the tree contained. Some interesting statistics are given in the current number of *Prometheus* (No. 336, p. 383), concerning the white poplar. In the neighbourhood of Moscow, out of 597 trees struck by lightning, no less than half of them—more accurately 302—turned out to be the white poplar. This fact is sufficient to show that the degree of conductivity of this tree must be very high, and it has been suggested that country people should plant these

trees for natural lightning conductors. The pyramid-poplar has also for a long time been known to be specially attached to the lightning flash, so that by planting many of these round the farmhouses they should form natural and inexpensive lightning conductors, more effective perhaps than many now in use.

ACCORDING to Hermann Feigl ("Die Religion der Chinesen," *Oesterreich. Monatsschr. für den Orient*, xxii., 1896, 1), the primitive belief of the Chinese has been suppressed by Confucianism and Buddhism. Chinese religion has never had the puerilities, the animal cults, the cruelties and fanaticism of other religions. Like the Jews, the Chinese had very vague ideas of future rewards and punishments and of life after death. Their ancestor cult had no mythologic motive like that of India or Japan. The Chinese, like the Jews and ancient Egyptians, had the philosophic conception that continuation of life lies not in the immortality of the soul, but in the perpetual remembrance of the righteous by mankind. The Chinese could not persevere with metaphysical problems, and so did not advance. Confucius appeared at a time when the Chinese felt the need of a religion; but the greatest of their religious reformers was Lao-tseu, who was born about 604 B.C., or half a century before Confucius. He introduced the word Tao, "way," for the idea of divinity, which previously was confused with the visible sky (Schang-ti). Tao is the element from which everything comes, and to which everything returns. Lao-tseu also taught that the departure of the soul from the body was no disaster for us. But he was too vague to be a convincing reformer. Confucius was not an original thinker like Lao-tseu; he culled what he liked from the older writers, and allowed people to believe what they chose. When consulted he spoke in an oracular manner, and while satisfying no one he offended nobody.

PERHAPS the most interesting region visited by H.M.S. *Challenger*, during her memorable expedition, was that designated by Dr. John Murray as the "Kerguelen Region of the Great Southern Ocean." Leaving the Cape of Good Hope on December 17, 1873, the *Challenger* proceeded in a south-easterly direction, visiting in succession Prince Edward and Marion Islands, the Crozet Islands, Kerguelen Island, and Heard Island, then southward, until on February 16, 1874, having reached longitude 78° 22' E., some ten miles beyond the Antarctic Circle, she turned north-easterly, for Melbourne, arriving there on March 17, 1874. During this three months' cruise many trawlings were made, and some of the rarest and most remarkable forms were met with. Each one of the staff of writers will remember with what excitement and delight he approached the examination of the results of some of the deep-sea dredgings, from this region, especially the eight trawlings from the most southerly position reached, where the depth was between 1260 and 2600 fathoms. It is of this region, and of the zoological treasures found therein, that Dr. J. Murray writes in a memoir published in the early part of this year in the *Transactions* of the Royal Society of Edinburgh (vol. xxxviii.), thus enabling the student to obtain, within a brief compass, the story, as far as it is as yet recorded, of the marine fauna of this part of the ocean. After a short introduction, we have full lists of the Metazoa found by the *Challenger*, arranged according to the depths. About some of the islands, Kerguelen especially, many of the species were taken from quite shallow water; this is followed by a list of Metazoa recorded from sources other than the *Challenger*, a list of great importance for purposes of comparison. A list is given of identical or closely-related forms, found in the extra-tropical regions of the Northern and Southern hemispheres, but unknown hitherto within the tropics. There are also lists of the Foraminifera, Diatoms, and surface organisms of the region, and of the Radiolaria found in the deposit dredged from a depth of 1950 fathoms, at Station 157 in the Southern Indian Ocean.

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PROF. E. C. PICKERING has communicated to the *American Meteorological Journal* for this month, the results of an investigation carried out by Prof. S. I. Bailey, on the diurnal oscillation of atmospheric pressure at the Peruvian stations of Harvard College Observatory. The stations, which are eight in number, are situated along a line nearly four hundred miles long, drawn approximately north and south across the Andes. The lowest station has a very small elevation above the sea-level, while the highest, that on the Misti summit, has an altitude not far short of 20,000 feet, the others being admirably chosen with a view to obtaining meteorological results from a great variety of elevations. The stations are well supplied with instruments, including in every case a Richard barograph, although no mercurial barometer has been regularly in use at any station except Arequipa Observatory. The natural difficulties of visiting the Misti summit have been increased by the civil war, and in consequence of this the continuity of the record has suffered. Energy less active than that possessed by Prof. Pickering and his assistants would have led to the evacuation of the station. At Arequipa Observatory (elevation 8000 feet), where the annual range of the barometer varies from 22.626 inches to 22.404 inches, a comparison was made between the results obtained from the mercurial barometer and the Richard barograph, and after a certain uniform correction had been applied to the latter, it was found that the monthly barographic means were liable to an error as great as 0.034 inch, and that the mean error for the year was 0.013 inch. At all the stations the diurnal oscillations are well marked, and very uniform from day to day. There are striking differences, however, between the records in the different localities, especially in the hour of the morning maximum, and the intensity of the afternoon maximum and minimum. The paper contains the curves for the mean diurnal variation for the year April 1894-March 1895, together with the corresponding values for a single day, selected at random, and the investigation points out this important result, that "from these curves it appears that the retardation of the morning maximum is at least, in part, a function of the altitude." The diagram shows that the time of maximum near the sea-level is 9 a.m.; at 4000 feet, about 9h. 20m.; at 8000 feet, about 9h. 40m., while at the Misti summit the maximum pressure is near noon.

THE Pilot Chart of the North Atlantic Ocean for the current month contains a chart showing the tracks of the storms during March for the six years 1890-95, north of the 35th parallel and west of the 30th meridian. The diagram shows that the portions of the North Atlantic within the prescribed limits in which storms are most frequent during March are (1) the region immediately to the east of Cape Hatteras and the New Jersey coast, and (2) the area included between the parallels of 45° and 50°, and the meridians of 30° and 40°. Each track bears a number, by which the date of the appearance of the storm may be obtained by reference to a table. The information is both interesting and useful, and no doubt similar tracks will be given for other months.

THE Zi-ka-wei Observatory has published the first of a proposed series of papers entitled "Typhoon Highways in the Far East." The present paper is by the Rev. L. Froc, S.J., and refers to the storms which have occurred near the south end of Formosa Strait, between 1877 and 1895, and especially to the typhoon of September 19 last. The principal conclusions arrived at are (1) that a violent typhoon may be expected to traverse the south end of the Formosa Channel at least once a year; (2) the direction from the South Cape varies between N. 20° W. and N. 85° W., the ensemble of the storms forms a kind of fan, whose point lies upon the south end of Formosa Island, and which thence spreads out to the coast of China; (3) the period of occurrence is from the middle of July to the beginning of

October; a curve of the monthly frequency shows that a considerable maximum coincides with the equinox. The most striking characteristics are the suddenness of their appearance and the narrowness of the storm area; in some cases Father Dechevrens has shown that the diameter did not exceed fifty miles, and that the velocity of translation may vary from eight to twenty-six miles per hour. The author discusses, at some length, the various signs which precede the occurrence of the typhoons.

THE numbers of the *Naturwissenschaftliche Wochenschrift* for February 16 to March 8 contain an account, by Dr. H. Hallier, of a botanical investigation of Central Borneo, organised at the instance of the Dutch Government, under the direction of Dr. Treub, of Buitenzorg. This portion of the island is an almost unknown land from a natural history point of view; previous explorations having been made from Sarawak, Labuan, British North Borneo, and Dutch South Borneo. A very large collection was made, calculated to amount to about 3000 distinct species of dried plants, as well as a considerable quantity of alcohol material, and many living roots. These are now being examined at the Botanical Institution at Buitenzorg. The mountain K'nepai was ascended, about 1125 metres high. Its flora is described as being especially rich in Orchideæ and in species of *Nepenthes*.

THE interesting question has been recently again raised, by Messrs. Gotschlich and Weigang, as to whether the virulence of cholera cultures is dependent upon the number of bacilli present, or whether the age of the culture affects the toxic character of the individual bacilli. Estimations have been made of the number of bacilli present in cholera cultures at different periods of time, and it has been found that a rapid diminution takes place with the increasing age of the culture. Thus at 37° C. at the end of two days, only 10 per cent. remained of those present at the close of the fully virulent age of twenty hours, whilst after three days only 1 per cent. were left. Messrs. Gotschlich and Weigang have also determined the approximate number of individual cholera bacilli which constitutes a lethal dose, and this they state to be from 200 to 300 million bacilli, and that as long as this number is present, it is a matter of no consequence whether the dose is abstracted from a twenty hours' old culture or from a three days' old culture. The apparent diminution in the virulence of cultures some days old, is not due to the attenuation of the bacilli at this age, but is attributable to a smaller number being present in the culture, for equally fatal results were obtained when larger quantities of such cultivations were employed.

PSYCHOLOGY has found in America a congenial field for development, one of the clearest marks of its vitality there being the excellent *Psychological Review*. The March number of that journal contains the address recently delivered by Prof. McKeen Cattell as President of the American Psychological Association; and how great has been the academic recognition of the subject in America during the past few years is shown by his remark, that "psychology is a required subject in the undergraduate curriculum wherever studies are required, and among university courses psychology now rivals the other leading sciences in the number of students attracted, and in the amount of original work accomplished." The following other indications of growth are recorded in the same journal:—The psychological department of Cornell University has moved to Morrill Hall, where it is said to have nine rooms and four thousand square feet of floor space. The psychological laboratory of the University of Nebraska has been moved into the first-floor of the new library building, and occupies a series of five rooms with a floor space of three thousand square feet. In the new biological buildings, which the University of Chicago will erect with a part of the million dollars given by Miss Culver, ample provision

will be made for the psychological laboratory. In the new Schermerhorn Hall of Natural Sciences, to be erected for Columbia University at a cost of about 400,000 dollars, more than one-tenth of the building is allotted to psychology. At this rate of progress, America will soon rival Germany in psychological laboratories and productions.

THE Académie Royale de Belgique announce the following prize subjects for 1897:—New researches on the thermal conductivities of liquids and solutions. An important contribution to the geometry of straight lines. A discussion, from the theoretical point of view, of the question of variations of latitude, and their causes, the paper to include a criticism of the works of geometers on the subject, from Laplace to the present time. New researches on the physiological rôle of albuminoid substances in the nutrition of animals and plants. New anatomical and systematic researches on insects of the group Aptera. Does there exist a nucleus in Schizophytes? If so, what is its structure, and what its mode of division? A discussion of the changes made in the classification of the deposits which constituted the *Laekian* system of Dumont, most of which are usually referred to the Upper Eocene; to bring forward new evidence in support of the classification adopted. The value of the prize to be awarded for the best work in each of these subjects is six hundred francs. Memoirs may be written in French or Flemish, and should be addressed to the Secretary of the Belgian Academies before the beginning of August next year.

MESSRS. WILLIAMS AND NORGATE have just issued a classified list of recent scientific publications, chiefly of foreign origin. Book-hunters seeking scientific works would do well to consult the list.

MR. HIRAM S. MAXIM is contributing a series of illustrated articles on "Automatic Firing Guns" to *Industries and Iron*.

A PAPER on "The Food and Labour-Power of Nations," contributed by Prof. F. S. Nitti to the March number of the *Economic Journal*, contains a large number of facts and figures of interest from a physiological, as well as from an economic and social, point of view.

THE Tōkyō Mathematio-Physical Society has recently published in its *Proceedings* a reprint of Clifford's Translation of Riemann's Habilitationsschrift (1854), viz. on the hypotheses which lie at the bases of geometry (*NATURE*, vol. viii. Nos. 183, 184, and *Mathematical Papers*, pp. 55-71).

AN elaborate discourse on Helmholtz's investigations on the "Grundlagen der Mathematik und Mechanik," which was delivered in November last at Heidelberg University, by Prof. Leo Koenigsberger, the occasion being a celebration in memory of the founder of the University, has now been published by B. G. Teubner, of Leipzig. A photogravure of Helmholtz forms a frontispiece to the reprint.

WE are glad to receive from the agricultural department of the University Extension College, Reading, the second annual report of field experiments on hay, pasture, potatoes, swedes and mangels, carried out in Berkshire, Hampshire, and Oxfordshire, during 1895, under the direction of Mr. Douglas Gilchrist and Mr. P. H. Foulkes. A notable feature of the work is that it was carried out on land placed at the disposal of the experimenters by various land-owners and farmers, who also gave assistance in the actual superintendence and cultivation of the plots. Two important Farmers' Clubs have also co-operated in the work. By thus enlisting the help of farmers, interest in agricultural experiments is greatly increased, and the results are more likely to command the attention of practical men than if they were obtained by flower-pot cultivation.

THE opening address for the Session 1894-95, delivered to the Royal Physical Society of Edinburgh by Prof. H. A. Nicholson, has recently been published in the *Proceedings* of that Society, and will be found to be an admirable summary of the evidence that has accumulated of late years against the doctrine of Ocean Permanence. The distribution of land and sea in former periods is discussed, and the truly abyssal characters of certain sediments now forming part of continental masses are pointed out in some detail, while mention is made of the evidence for a former Antarctic continent, and other matters are more briefly discussed.

A RECENT number of the *Annali* of the Meteorological and Geodynamic Office of Rome contains an interesting paper, by S. Arcidiacono, on the Syracuse earthquake of April 13, 1895. The disturbed area comprises the south-east corner of Sicily. On the map which accompanies the paper, eight isoseismal lines are drawn, corresponding to intensities 1 to 8 of the Rossi-Forrel scale. These are elliptical in form, and have a common axis running from Cape Passero in a north-westerly direction through Vizzini, which is close to the centre of the meizoseismal curve. Applying the method of Dutton and Hayden, the depth of the seismic focus is estimated at about 7400 metres. The axis of the isoseismals coincides nearly with that of the ridge of Monte Lauro, and joins the two principal volcanic centres, now extinct, of the Val di Noto.

THE additions to the Zoological Society's Gardens during the past week include a Diana Monkey (*Cercopithecus diana*, ♂) from north of River Prah, Ashanti, presented by Captain Edgar E. Bernard; an American Tapir (*Tapirus americanus*, ♂) from Brazil, presented by Mr. Basil J. Freeland; a Markhor (*Capra megaceros*, ♂) from Peshawur, presented by Colonel Paterson; three Canarian Laurel Pigeons (*Columba laurivora*) from the island of Gomera, Canary Islands, presented by Mr. E. G. B. Meade-Waldo; a Common Mynah (*Acridotheres tristis*) from India, presented by Mrs. Sibyl E. Kennedy; a Herring Gull (*Larus argentatus*), British, presented by Dr. E. Goddard; two Grey Ichnéumons (*Herpestes griseus*) from India, deposited; two Amherst Pheasants (*Thaumalea amherstii*, ♀♀) from Szechuan, China; two Swinhoe's Pheasants (*Euplocamus swinhoii*, ♂♀) from Formosa, a Bar-tailed Pheasant (*Phasianus reevesi*) from North China, two Great American Egrets (*Ardea egretta*) from America, a Porto Rico Pigeon (*Columba corensis*) from the West Indies, a Vinaceous Pigeon (*Columba vinacea*) from South America, two Rosy Parrakeets (*Palæornis rosa*, ♂♀) from Burmah, two Musky Lorikeets (*Trichoglossus concinnus*, ♂♀) from Australia, purchased; two Barbary Wild Sheep (*Ovis tragelaphus*, ♂♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE FIFTH SATELLITE OF JUPITER.—The opposition of Jupiter in 1894 occurred at a very unfavourable time for observations at Mount Hamilton, but a few measures of the fifth satellite were secured with some difficulty by Prof. Barnard. During the observations of the satellite, the planet was obscured by a piece of smoked mica covering half the field. For the measurement of distances the micrometer wires were usually placed perpendicular to the belts on the planet; but on November 18 they were set parallel to the belts, and these measurements accordingly enable the Jovian latitude of the satellite to be determined. Only one eastern elongation was observed. This was on December 3, and the distance was found to be $59''.5$; or, reduced to the mean distance of the planet = $5''.20$ astronomical units, $48''.17$. On this date the elongation occurred at 23h. 43^m. 6^s. G.M.T., the corresponding time in Marth's ephemeris being 23h. 42^m. G.M.T., so that the observed time was over a minute behind the computed time. The ephemeris is based on a period of 11h. 57^m. 22^s. 6^s., and the observed elongation indicates that this period will represent the motion of

the satellite with sufficient accuracy to find it for several years to come (*Astronomical Journal*, No. 367).

THE YERKES OBSERVATORY.—Additional particulars as to the proposed equipment of the new Yerkes Observatory of the University of Chicago are furnished by Bulletin No. 1, the first of a series of notices which will be published at irregular intervals in the *Astrophysical Journal*. The resident staff is to consist of Messrs. Hale, Burnham, Barnard, Wadsworth, Ellerman, and Ritchey, the last-named as optician. The 40-inch object-glass has been completed by Mr. Alvan Clark, and recent tests have shown the definition to be fully equal to that of the Lick telescope, while the light-gathering power is considerably greater. Electro-motors are provided to give the various movements to the instrument and to the elevating floor. The attachments to the great telescope include a solar spectroscope, a spectroheliograph for photographing the solar chromosphere in monochromatic light, a stellar spectroscope, and a photoheliograph of long focus for photographing the direct image of the sun on a large scale. A 12-inch refractor and a 24-inch reflector will also be erected. The meridian-room is designed to contain a large meridian circle, but will be provisionally occupied by a transit instrument. An instrument shop and optical laboratory will be fully equipped with the necessary tools, and it is hoped that it will be possible to construct many of the instruments and laboratory apparatus which may be required in occasional investigations. The main building is now under roof, and will be completed during the summer.

THE PROPER MOTION OF τ TAURI.—A discussion of the meridian observations of τ Tauri, which has been undertaken by Dr. Fritz Cohen (*Ast. Nach.*, 3341), indicates a variable amount of proper motion in declination, but there is less certainty as to the motion in right ascension. For an explanation of the irregularities it is suggested that the star is attended by a dark companion similar to that associated with Procyon, and only giving evidence of its existence by its gravitational effects on the brighter star, causing it to describe an orbit round the common centre of gravity. It is true that the star is already known to be double, the magnitudes of the components being 4.5 and 8.5; but the distance of the visible companion is so great ($79''$), that the detection of an orbital movement in the comparatively short period covered by the meridian observations is scarcely probable. There is an increase of $11''$ in the distance measured in 1823 as compared with that determined in 1783, but as the distance and position angle in 1823 agree substantially with those in 1895, the earliest recorded measure is not to be depended upon. An investigation of the movements of the star by means of micrometric measurements in relation to neighbouring stars is suggested. The association of dark bodies with bright stars, in some cases producing variability either by eclipses or other means, but in others having no appreciable effect on the brightness, is a very notable feature of recent astronomical discoveries.

TWO REMARKABLE SOLAR PROMINENCES.—Father Fenzy reports the observation of two very striking solar prominences (*Astrophysical Journal*, vol. iii. p. 192). One observed on July 15 last was remarkable for its enormous velocity of 858 km. per second in the line of sight; the other, on September 30, for its great height of $11' 28''$, which it attained with a mean velocity of 448 km. per second.

The first one was found precisely at a point on the sun's limb where a group of sun-spots was passing out of view, and its form changed with extraordinary rapidity.

The second prominence was unusually bright, and at 10 a.m. was about $1'$ high; eleven minutes later it had mounted to $4'$, and the maximum altitude of $11' 28''$ was reached at 10.20, the velocity in the line of sight then being 746 km. per second. Half an hour from the beginning, the prominence was only $3' 16''$ above the photosphere. The spot associated with the latter prominence showed a considerable proper motion in the earlier days of its existence, amounting to about 600 km. per hour. The convergence of some of the brighter "stream lines" of the prominences towards a spot was especially marked in these observations, and it is suggested that they have a radial arrangement with respect to the spots. This structure seems to point to the existence of currents in the solar atmosphere, directed either towards the interior of a spot, or outwards from it.

It is stated that an explosion taking place over a sun-spot would accord well with the appearances usually seen in the great prominences which have been observed at Kalocsa, but it is by no means asserted that actual explosions take place.